ruary 2, 1884. During these months the extremes at Fort William were 73°·8 and 27°·0.

The barometric observations at Fort William and Ben Nevis were dealt with in a similar manner, and a table of corrections of the Ben Nevis observations to sea-level was constructed directly from the observations of the two stations, the table giving the approximate corrections for each tenth of an inch of the sea-level pressure, and for each degree of mean temperature of the stratum of air from the Observatory to sea-level, which was assumed to be the arithmetic mean of the temperatures at the two stations. The normals of atmospheric pressure for Ben Nevis were then calculated. The lowest normal monthly pressure is 25·141 inches for January, and the highest 25·410 inches for June, and for the year 25·281 inches. Comparing the normal pressures at the high- and low-level stations, pressure on Ben Nevis is on the mean of the year 4·557 inches lower than at the sea-level at Fort William, the least monthly difference being 4·484 inches in July, and the greatest 4·620 inches in February.

The morning maximum of pressure was at 10 a.m. in January, at noon in February and March, 1.30 p.m. in April and May, while in June it was delayed to 3 p.m. From Mr. Wragge's observations in 1882, the same diurnal phase of the pressure occurred about 9 a.m. in the summer months at Fort William, being thus six hours earlier than on the top of Ben Nevis. From February to June the morning minimum of pressure was very large. On the other hand, the afternoon minimum was comparatively small; and as the season advanced it became less and less pronounced, till in June the diurnal oscillation approached closely to one single minimum and maximum. Owing to the low readings of the morning minimum and the high readings of the afternoon maximum, which have their explanation in the diurnal change of the temperature of the aërial stratum below the level of the Observatory, the diurnal range of pressure on Ben Nevis exceeds that of any other meteorological station in Scotland.

The rainfall on the top of Ben Nevis is very large. At Fort William the mean annual amount is about 83 inches. During the three years beginning 1881, while the rainfall at Fort William was 24·59 inches from June to October, it was 47·10 inches on Ben Nevis. During the two years 1882 and 1883, for the same months, the rainfall at Fort William was 21·96 inches; at the lake (1840 feet high), 28·42 inches; but on Ben Nevis, 44·35 inches: hence during the summer months the rainfall on Ben Nevis is nearly double that of Fort William, and the greater part of the increase in the rainfall from Fort William to the top of Ben Nevis takes place above the level of the lake. No inconsiderable proportion of the large rainfall collected on the top is due to driving mists and drifting wet fogs, during which, though often no raindrops are visible, or only a few small drops at wide intervals apart, yet everything is dripping wet, and the funnel of the rain-gauge is crowded with numerous runnels of clear water, steadily trickling down into the receiver of the gauge.

On plains and extensive plateaux the wind attains a diurnal maximum velocity shortly after noon which is generally nearly double the minimum velocity, which occurs shortly before sunrise. But on Ben Nevis, in common with other observatories which are situated on peaks rising to a considerable height above the whole of the surrounding region, the reverse of this takes place, the maximum velocity occurring during the night, and the minimum during the day. The difference between the mean minimum and maximum hourly velocities on Ben Nevis in each of the seven months ending June last was about five miles. A tendency to a secondary maximum was shown in May, but in March, April, and June no such tendency was apparent. A full gale from south-east blew almost continuously at the Observatory from February 15 to 21, and during these seven days there was a mean maximum of 58 miles from 5 to 6 a.m. and a mean minimum of 42 miles from 4 to 5 p.m. With an hourly difference of 16 miles, the daily variation in the velocity of the wind was maintained during the continuance of this great storm.

Another main object in constructing the table of corrections to sea-level for Ben Nevis Observatory was to afford a ready comparison between the atmospheric pressure at sea-level and that on Ben Nevis from the important bearings of the observed differences on the changes of weather which precede, accompany, and follow storms, and on such inquiries as the singular and opposite relations which obtain during storms of wind and during the remarkable weather which often occurs within, or on the confines of, anticyclones.

ALEXANDER BUCHAN

THE FORESTRY EXHIBITION

SINCE our last notice of the International Forestry Exhibition great progress has been made in the concentration and arrangement of the various products which testify to the importance of the subject. We believe that the juries have now met, and such names as Sir Joseph Hooker, Colonel Moncreiff, R.A., Profs. T. R. Fraser of Edinburgh, Bayley Balfour of Oxford, Dr. Lyons, M.P., with several Indian and Scotch Forest Officials, and others will inspire confidence in their work. We to-day give a description of one of the most interesting sections, which well repays a visit.

The Japanese Court occupies the eastern transept, and forms one of the largest and most important sections. The whole arrangements have been carried out in the most thorough and business-like manner. Immediately on the arrival of their goods, knowing beforehand the amount of space required, and working with a rapidity and skill which might put to shame some more civilised nations, the Japanese Commissioners have shown that they are far in advance of many countries in business capacity as well as in the science of forestry. In Great Britain the importance of forestry to the welfare of the country and its colonies has but lately been recognised. In Japan, on the contrary, it has long formed an important feature in national education. This is evident from the ingenious devices represented on the walls of the department, and which can only have been the outcome of long experience.

With excellent taste the Japanese have placed the timber in the most prominent position, and the products in the background, giving at once the impression that it is purely a forestry exhibit. The central tables are occupied with longitudinal sections of trees, with the surface planed so as to render the grain visible. Above these are similar sections, but showing the bark, and above these are coloured drawings of the trees yielding them. At the foot of these sections a paper explains in English the Japanese name, the botanical name and habitat, and the relative rarity or abundance of the tree, its girth and height at fifty years old and at maturity, the best mode of propagation, the quality and uses of its wood and of other parts. Each section, drawing, and description is marked with a corresponding number. On the wall of the Southern Court are some artistic drawings in monochrome of the various devices for felling and floating the trees along mountain streams, for slipping them over precipitous cliffs, and for stopping and collecting the timber at certain localities in its course for storage. The expedients adopted for floating the timber down narrow gullies, and the sledges used for sliding it down over the snow in winter, and other details of forest work and a forester's life, are depicted in a manner that is easy to remember from the quaint dress, the life-like attitude, and excessive energy thrown into the actions represented. These drawings are mounted in wooden frames, and the background

tastefully decorated in a simple manner with fragments of veneer of different colours. They are accompanied by models which still better illustrate the means adopted in mountainous countries, and must prove exceedingly instructive to students of forestry.

Next in order come the tools used in the various operations of cutting, transporting, and working the timber and peeling the bark. Some of the axes and saws are of extremely peculiar shape, but admirably fitted for the purposes for which they are intended.

According to a printed table hung on the end wall, the area of the Japanese Empire is 38,563,718 chos (a cho = 2·450 acres), the area of forest (excluding the islands of Okinawa and Hokkaido) being 11,866,626 chos, or rather less than one-third of the country. Of this area 5,259,182 chos are worked by the Government, and 6,607,443 chos by private individuals. About a quarter of the Empire has, however, not yet been surveyed; the above figures, therefore, only refer to the surveyed portion. Accompanying this table is a map giving the distribution of trees in Japan, and marking out certain zones, each indicated by some particular tree forming a prominent feature in the landscape. Of these zones *Ficus Wightiana* characterises the lowest, *Pinus Thunbergii* the second; then follow in order *Fagus sylvatica*, *Abies Veitchii*, and *Pinus Cembra*. The extent of these zones is marked in colours on the map, and on excellent coloured drawings representing the habit of the five trees, and their foliage, flowers, and fruit in life-size are presented at one glance. The less important productions of the forests are appropriately illustrated by smaller collections, a simple expedient by which an idea of their relative consequence is easily conveyed. Fungi, dried and preserved in pickle, and a dried lichen (a species of *Gyrophora*), and a collection of seeds of forest-trees, well preserved, and carefully named, are placed near. Several fungi are cultivated on special trees. According to notes affixed to the tree-sections, among the trees thus employed are *Celtis sinensis*, *Carpinus laxiflora*, *Quercus crispula*, *cuspidata*, and *glandulifera*.

Roots, barks, and seeds used in medicine are not so well represented as usual. Even menthol, now tolerably well known in this country as a remedy for neuralgia, is not exhibited. A beautiful specimen of insect wax resembling spermaceti in appearance, but much harder, and identical with that used in China to coat candles to prevent their guttering, is exhibited. The insect producing it is cultivated on *Ligustrum Ibotu* and *Fraxinus pubinervis*.

An exceedingly ingenious double chop-stick is here shown, consisting of a piece of white wood, slit two-thirds of its length; on pulling the pieces apart, a wooden toothpick is seen inclosed in the centre. As the wood has never been entirely split, it is puzzling to know how the toothpick was inserted. This is done by cutting it with a special instrument when the wood is wet and can be extended. The leaves of two other plants besides those of tobacco are shown, the one made into cigarettes, and the other simply dried for smoking (*Sterculia platanifolia*).

The cooperage work seems to be carefully done, the barrels having polished surfaces, and in some instances the bands are made of plaited bamboo. The polishing of rough surfaces appears to be effected by the rough leaves of *Aphananthe aspera* and the stems of a species of *Equisetum*. Japanese tooth-brushes are exhibited, made of the frayed out ends of a piece of white wood; and combs, and even tooth-combs, are made of similar material of a harder character, such as the wood of *Olea Aquifolium* and *Hovenia dulcis*. Dyeing and tanning barks are comparatively few in number, and walking sticks do not present any great variety, only a few being engraved or ornamented. A simple flower-pot for the wall of drawing-rooms consists of two joints of a large bamboo, with a piece cut out at the side of each joint so as to permit of a fern or bouquet depending over it.

In the left-hand court may be seen some bent wood furniture that might fairly compete with that of Austrian manufacture. In one corner may be seen a series of young trees four or five years old, imported from France, Germany, the United States, and other countries; indicating that acclimatisation of the useful trees of other countries has already been commenced in Japan. Wood-engraving and printing in one or more colours is illustrated by the engravings placed side by side with the blocks. The celebrated Japanese lacquer is exhibited in the crude state, and also applied to knick-knacks and other articles, some specimens of lacquered slabs having so high a polish as to appear like glazed ornamental tiles. These are accompanied by a coloured drawing of the foliage and flowers of the lacquer-tree painted on the wood of the same tree and framed, with other portions having the bark attached. Several other useful timber-trees are illustrated in the same ingenious manner. The almost transparent yet strong and tough paper made from the fibre of the paper mulberry-tree (*Broussonettia papyrifera*) is shown, but its manufacture is not illustrated by drawings, the exhibits being limited to products. This paper rolled into the form of a spill is strong enough to be used like string. Exceedingly thin planed shavings of wood, scarcely thicker than the paper above alluded to, occupy a conspicuous position. These are used for packing butter or other goods of similar description. A cursory glance at the notes appended to the sections of wood reveals many interesting facts regarding some Japanese trees and shrubs commonly cultivated in this country. Thus an oil is obtained from the seeds of the common Camellia (*C. japonica*), and rope is made from the stems of *Wistaria sinensis*. Charcoal, for the manufacture of gunpowder, is prepared from the wood of *Paulownia imperialis*, and the wood of the deliciously-scented *Olea fragrans* is used for wood-engraving and combs. A shrub, also indigenous in this country, *Viburnum opulus*, furnishes tooth-picks. A very ingenious use of the trunks of trees is the hollowing them out into drain-pipes, each about 6 or 8 feet long, and fitting into each other at the end. On the walls of this court illustrations are given of the mode of preventing the slipping away of soil on mountain-sides, and of the trees and shrubs and herbs useful for binding sandy soil or embankments, &c. Altogether the Japanese section is an exceedingly interesting one, and offers many useful suggestions to the foresters of Western countries.

PRACTICAL TAXIDERMY

AMIDST the many criticisms which are passed by visitors upon the collections in the new Natural History Museum of South Kensington, there is always to be found a word of praise for the improved appearance of the mounted animals in that Museum, and it may fairly be said that the encomiums which are heard on all sides have been justly earned by Dr. Günther and the staff of the Zoological Department; that is to say, if an honest endeavour to present to the public something better than can be seen in other museums counts for anything. The officers of the British Museum, in transferring the zoological collections from Bloomsbury to South Kensington, were heavily handicapped, for it was impossible to commence the mounting of the collections *de novo*, and they therefore had upon their hands a vast number of interesting specimens unfit to exhibit to the public, but valuable to the naturalist, and worthy of preservation as forming a historical part of that great zoological collection which is admitted by naturalists to be intrinsically the finest in the world. For some time before the removal a careful selection of duplicate specimens had been made, and these had been distributed to various provincial museums, but all those which possessed any scientific value, such as types, &c., have been carefully unmounted and added to the collection of skins, and it was curious